

IN THE SPECIFICATION

Please replace the paragraph at page 2, lines 3-10, with the following rewritten paragraph:

The inventors have been engaged in studies on practical application of this kind of direct iron making method, and this time especially studied a method from various aspects aiming at improvement of smooth operations in a series of processes from solid-phase reduction of iron sources by using a moving-hearth reducing furnace such as a rotary hearth furnace to melting reduced iron sources in a melting furnace, as well as improvement of the quality of molten iron obtained, further suppression of degradation of processing facilities, in particular refractory, and extension of lifetime of the facilities.

Please replace the paragraph beginning at page 2, line 19, through page 3, line 5, with the following rewritten paragraph:

According to an aspect of the present invention which solved the above problems, a method of producing a molten iron having a carbon content of 3.0 mass% or more, comprises: feeding a raw material mixture containing a carbonaceous reducing agent, an iron oxide-containing material and a CaO-containing material onto a hearth of a moving-hearth reducing furnace; heating the raw material mixture in the reducing furnace and thus reducing an iron oxide in the raw material mixture; generating a solid reduced iron having a metallization ratio of 80% or more; feeding the solid reduced iron in the state kept at high temperature into a melting furnace and further heating the solid reduced iron therein; and reducing ~~the partially remaining iron oxide~~ an iron oxide partially remained in the solid reduced iron and melting the solid reduced iron; wherein a blending amount of the CaO-containing material in the raw material mixture is adjusted in such a manner that another feeding of the CaO-containing material into the melting furnace makes a basicity of a slag

generated in the melting furnace 1.1 or more and that an feeding amount of the CaO-containing material becomes 40 kg or less per ton of the molten iron obtained in the melting furnace.

On page 4, between lines 16 and 18, please insert the following new paragraph:

Each part codes and abbreviations in these figures are as follows:

Please replace the paragraph at page 4, lines 18-24, with the following rewritten paragraph:

(A): rotary-hearth reducing furnace, (B): electric melting furnace, (C): iron-bath melting furnace, (1): carbonaceous material (hearth material), (2): raw material mixture (pellet), (3): raw material-feeding hopper, (4): rotary hearth, (5): burner, (6): discharge device, (7): exhaust gas duct, (8): feed chute, (9): electrode, (10): molten slag outlet, (11): molten iron outlet, (12): exhaust gas duct, (13): top blowing lance, (14): bottom-blowing nozzle, (15): side-blowing nozzle, Fe: molten iron and S: molten slag.

Please replace the paragraph at page 9, lines 6-16, with the following rewritten paragraph:

It is for the purpose of lowering an S content in the molten iron ([S]) by transferring the ~~sulfur content in the molten iron, [S],~~ the sulfur in the molten iron toward the slag. If a raw material mixture made of coal, coke or the like as a carbonaceous reducing agent (generally, a raw material compact formed of the mixture in a shape of pellet, aggregate, etc., or a semi-compact lightly pressed and formed of the mixture) is used, the solid reduced iron obtained by heat-reducing the raw material mixture contains a great amount of sulfur derived from the coal or coke; or if a coal-based powder is used for a hearth material, the solid

reduced iron also contains a great amount of sulfur; therefore, use of these carbon sources as a reducing component results in containment of a significant amount of sulfur in the solid reduced iron.

Please replace the paragraph at page 10, lines 3-12, with the following rewritten paragraph:

After studies on the (FeO) content in slag needed for increasing the above partition ratio, (S)/[S], and lowering the sulfur content in molten iron, it has been found that the content may be suppressed about 5 mass% or less and preferably 2 mass% or less. After further studies on the practical requirement for reducing the (FeO) content in slag to 5 mass% or less, preferably 2 mass% or less, it has been also confirmed that it is possible to adjust the (FeO) content in slag to about 2 mass% or less reliably and consequently raise the S partition ratio toward slag and lower ~~[S] in the molten iron~~ the sulfur content in molten iron, [S], efficiently by increasing ~~[C] content in molten iron~~ a carbon content in molten iron, [C], to 3.0 mass% or more.

Please replace the paragraph at page 10, lines 13-16, with the following rewritten paragraph:

From the confirmation results above, the basicity of the slag generated in the melting furnace is adjusted to 1.1 or more, more preferably 1.3 or more, and ~~the [C] content in the molten iron~~ the carbon content in molten iron, [C], obtained to 3.0 mass% or more in the present invention.

Please replace the paragraph at page 20, lines 2-18, with the following rewritten paragraph:

The amount of the carbonaceous material consumed in all processes is preferably controlled as grossly classified into the ~~followings~~ following carbonaceous materials. One is a carbonaceous material (a) which is blended with a raw material mixture (or its compact, etc.) as a carbonaceous reducing agent, an amount of the carbonaceous material (a) is the amount of the carbon consumed if the raw material mixture is completely reduced; this carbon amount varies according to the operational condition of rotary-hearth reducing furnace, in particular its atmospheric gas composition. Another is a carbonaceous material (b) which is fed onto the moving hearth as a hearth material; this amount of the carbon, which converts oxidizing gases, such as  $\text{CO}_2$  generated by burner combustion in the reducing furnace, back into CO gas by reduction ( $\text{CO}_2 + \text{C} = 2\text{CO}$ ) in the neighborhood of the hearth, prevents re-oxidation of the solid reduced iron generated over the rotary hearth, and thus enables production of a solid reduced iron having a high metallization ratio and a low fluctuation in the metallization ratio, and is critical for stabilized melting operation of the solid reduced iron and the slag component in a melting furnace.

Please replace the paragraph at page 22, lines 12-21, with the following rewritten paragraph:

On the contrary, when an excessive amount of carbonaceous material is fed onto a hearth of a moving-hearth reducing furnace so that the carbon content of final molten iron becomes 3.0 mass% or more, the carbon content of the molten iron increases gradually up to the ~~saturated [C] content~~ saturated carbon content, but when it exceeds the ~~saturated [C] content~~ saturated carbon content, the excessive amount of carbon is discharged out of the melting furnace together with the slag and the like without being dissolved into the molten

iron in the melting furnace, when the molten iron and slag are discharged from the melting furnace. Thus, it is wasteful economically to supply the carbonaceous material into the reducing furnace in an amount exceeding the ~~saturated [C] content~~ saturated carbon content of the molten iron.

Please replace the paragraph at page 24, lines 4-12, with the following rewritten paragraph:

As apparent from Table 4, in the method (1) using the iron ore (A), being continuously fed approximately 1,137 kg per ton of molten iron [represented by kg/t(mi) in the table] of the solid reduced iron obtained in the rotary-hearth reducing furnace into the electric arc melting furnace under a high-temperature condition (about 900°C), approximately 44.9 kg per ton of molten iron of burnt lime (CaO) and approximately 24.1 kg per ton of molten iron of a carbonaceous material (here, that is coke) were fed at the same time into the melting furnace, for production of a carbon-saturated molten iron desirably having a ~~[C]~~ carbon content, [C], of 4.6 mass%.

Please replace the paragraph at page 25, lines 6-16, with the following rewritten paragraph:

In addition, ~~the carbonaceous material amount~~ the carbon material needed for heating in the melting furnace was supplied not onto the rotary hearth of the rotary-hearth reducing furnace on an upstream side but directly into the melting furnace, and thus, the reduction potential of hearth atmosphere declined to some extent at the last stage of reduction in the rotary-hearth reducing furnace. Consequently, the solid reduced iron discharged from the reducing furnace has a relatively low metallization ratio in the range of 78% to 88% and has a larger fluctuation therein (average: 84%), and thus the molten iron finally obtained has a

relatively lower carbon content of 4.2 mass%. The molten iron temperature also dropped to 1,475°C, lower by approximately 50°C than the desired value, and the operation period was also elongated.

Please replace the paragraph at page 26, lines 7-18, with the following rewritten paragraph:

The combustion ratio of the carbonaceous material in the rotary-hearth reducing furnace depends on the operational condition of the reducing furnace, and was approximately 69% in this experiment. In the method (2), the solid reduced iron obtained in the reducing furnace had an almost desirable metallization ratio of 92% and an extremely low fluctuation thereof of  $\pm 1.5\%$ . Further, it was possible to melt the slag and the solid reduced iron quite smoothly in the melting furnace even without addition of a slag-conditioning agent (burnt lime), demonstrating the advantageous features of the present invention. In addition, the ~~{C}~~ value of the molten iron carbon content of the molten iron, [C] finally obtained in this example was almost desirable 4.5 mass%, and it was also possible to control the molten iron temperature after treatment almost accurately to a desired value.

Please replace the paragraph at page 26, lines 19-28, with the following rewritten paragraph:

After sampling the solid reduced iron from the reducing furnace and separation of the slag from the solid reduced iron, mineral components in the slag were determined by X-ray analysis. The results showed presence of mineral components such as  $2\text{CaO-SiO}_2$ ,  $3\text{CaO-MgO-2SiO}_2$ ,  $3\text{CaO-2SiO}_2$  and  $2\text{CaO-Al}_2\text{O}_3\text{-SiO}_2$ , demonstrating generation of the complex oxides superior in solubility intended by the present invention. The results also showed that the S content of the molten slag collected from the melting furnace was approximately 1.5

mass% and the ~~[S] content of the molten iron~~ sulfur content of the molten iron, [S], approximately 0.04 mass%, indicating that most of sulfur is transferred to the slag.

Please replace the paragraph at page 30, lines 20-29, with the following rewritten paragraph:

In the method (2) according to the present invention, a solid reduced iron at approximately 900°C was fed into the melting furnace in a similar manner to the conventional method (1); because the fluctuation of the metallization ratio of the solid reduced iron was very small at 90 to 93%, the solid reduced iron melted very smoothly in the melting furnace, giving a molten iron having a carbon content, [C], of 4.7 mass% (almost identical with the desired value of 4.6 mass%) at a molten iron temperature of 1,530°C (desired value: 1,525°C); the ~~[S] content~~ sulfur content, [S], thereof is sufficiently low at 0.028 mass%, and the fluctuation in molten iron temperature was also very small at 1,500 to 1,550°C.